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LISTS OF SPECIES

Avifauna, Alto do Palácio, Serra do Cipó National Park, state of Minas Gerais, southeastern Brazil

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ABSTRACT: We surveyed the avifauna of Alto do Palácio, Serra do Cipó National Park, Minas Gerais state, Brazil. The park lies in the southern Espinhaço range, a significant biogeographical barrier that separates the forest areas of the Atlantic Forest on its eastern slope and the savanna-like vegetation of the Cerrado to its western slope. Representative habitats include open grasslands, with patches of rocky outcrops and woodlands. We recorded 151 species between 2007 and 2010. Most species occurred in woodlands, with the minority in rocky outcrops, eleven species are of conservation concern, nineteen are endemic to the Atlantic Forest, three to Cerrado, and four to the southeastern Brazilian mountaintops, two of which are restricted to *campos rupestres* of the Espinhaço range. Our results corroborate that the *campos rupestres* of the Espinhaço range are not only associated with the Cerrado biome, but harbor species associated with both surrounding biomes (Cerrado and Atlantic Forest) and to the mountaintops of southeastern Brazil, supporting the uniqueness of this vegetation type.

INTRODUCTION

The establishment of protected areas is considered one of the most efficient strategies in biodiversity conservation (Ervin 2003). Overall, protected areas capture a substantial component of total biodiversity and help buffer it from potential threats (Bruner *et al.* 2001; Naughton-Treves *et al.* 2005). Given the intense dependence of biodiversity conservation on the protected areas strategy and the enormous investments that have been made to establish them, it is important to understand how effectively such areas are achieving this goal (Gaston *et al.* 2008). Nevertheless, satisfactory syntheses are heavily constrained by the availability and accuracy of existing data. Such is the case for most of the legally protected areas in Brazil, where most national parks lack significant inventories of their flora and fauna (Madeira *et al.* 2008).

Serra do Cipó National Park (hereafter PNSC), located in Minas Gerais state, in southeastern Brazil, is not an exception to this unfortunate rule (Madeira *et al.* 2008). The park was originally conceived with the goal of protecting the headwaters of the Rio Cipó, a major tributary of the Rio das Velhas, itself a major part of the large and economically important watershed of the Rio São Francisco. The majestic landscape of numerous waterfalls and clean rivers flowing through rocky mountains also contributed to the decision to legally protect this area.

PNSC lies in the southern Espinhaço range of eastern Brazil, which is a significant biogeographical barrier that divides major hydrological basins and separates two important biomes in its central and southern portions: the forest areas of the Atlantic Forest on its eastern slope, and the savanna-like vegetation of the Cerrado to its western slope (Giulietti *et al.* 1997). The term "*campos rupestres*" (rocky fields or rocky grasslands) has been used to describe the vegetation that grows in shallow quartzite soil above 900 m in the Espinhaço range (Giullieti *et al.* 1997). In the Serra do Cipó, there are notable differences in the phytophysiognomies and moisture between the *campos rupestres* on either slope, primarily because the eastern slope is more subject to moist air from the Atlantic Ocean (Ribeiro *et al.* 2009). Preliminary biodiversity surveys suggest that such abiotic differences between eastern and western slopes are also well reflected in their bird and plant assemblages (Melo-Jr. *et al.* 2001; Ribeiro *et al.* 2009).

Despite numerous taxonomic and ecological studies of its flora (Giulietti *et al.* 1987), little is known about the avifauna of the Serra do Cipó region and most of our current knowledge is restricted to species checklists or range extensions (Willis and Oniki 1991; Melo-Jr. *et al.* 2001; Vasconcelos *et al.* 2008a; Vasconcelos and Rodrigues 2010) carried out on the western slope and mostly outside the boundaries of the park (Madeira *et al.* 2008). One such bird survey was conducted in a restricted lowland area of western PNSC within the Cerrado biome (Rodrigues *et al.* 2005). This study identified 226 species, *i.e.* 27% of the 837 total bird species that have so far been recorded in the Cerrado biome region of central Brazil (Silva 1995), including six species of Cerrado endemics and three considered Near Threatened with extinction. These findings alone illustrate the conservation importance of the park.

Here we present a checklist of bird species from Alto do Palácio (hereafter AP), which is located in the highlands of the eastern slope of the Serra do Cipó. Recent surveys have revealed that this site supports some unexpected bird species such as *Cinclodes pabsti* Sick, 1969 (Freitas *et al.* 2008), *Emberizoides ypiranganus* Ihering and Ihering, 1907 (Costa *et al.* 2008; Rodrigues *et al.* 2009), *Scytalopus iraiensis* Bornschein, Reinert and Pichorim, 1998 (Vasconcelos *et al.* 2008b), as well as some threatened species such as *Culicivora caudacuta* (Vieillot, 1818) (Lopes *et al.* 2009). All of these findings support the biogeographical relationships of the southern Espinhaço

range with the Andes and other subtropical mountainous regions of southern Brazil (Sick 1985; Vielliard 1990; Silveira and Cure 1993; Stehmann and Semir 2001; Vasconcelos *et al*. 2006).

Materials and Methods

Study Site

The current study was conducted at AP, in the northern end of the PNSC (19°15' S, 43°31' W, at approximately 1350 m above sea level), in Morro do Pilar county, Minas Gerais state, southeastern Brazil (Figure 1).

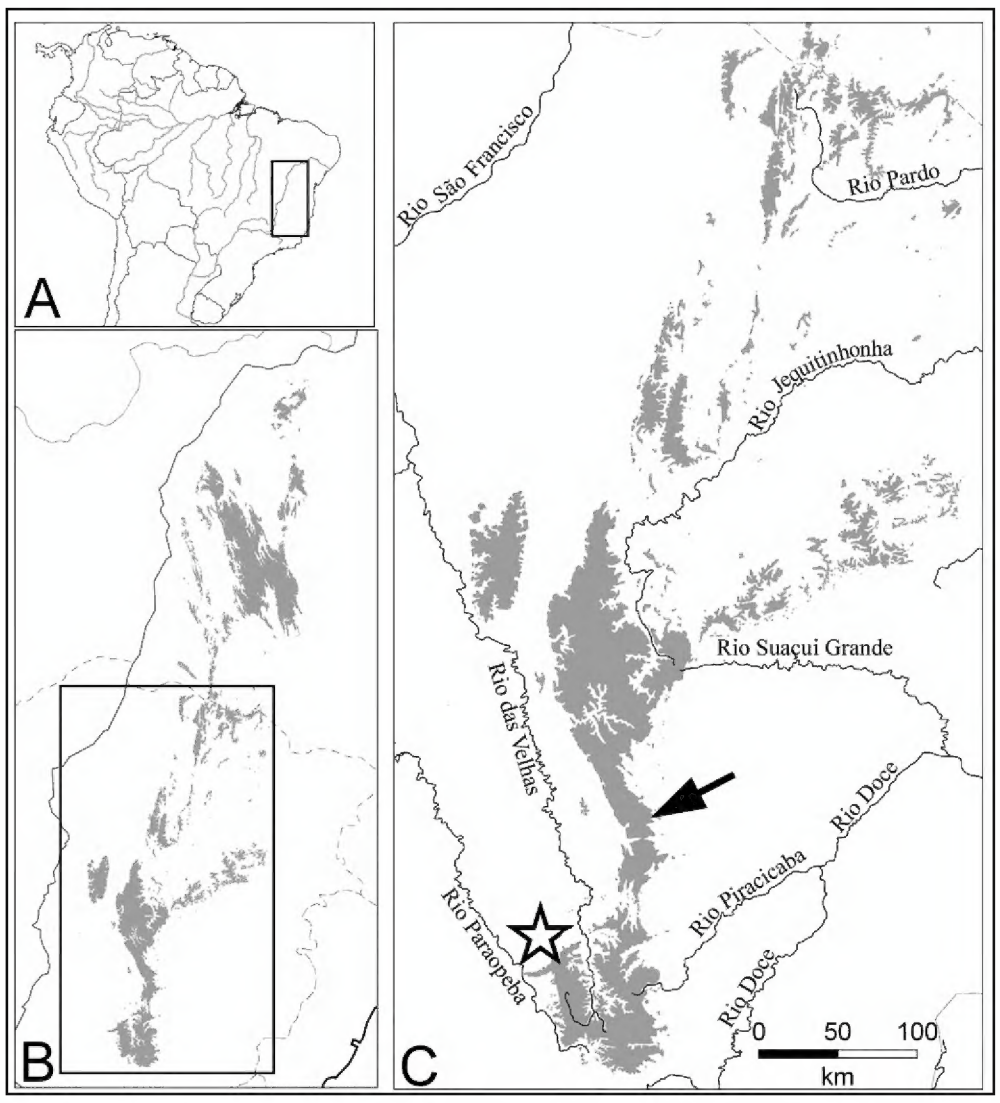

Figure 1. Eastern Brazil (A) showing the Espinhaço Range (gray area 1,000 m above sea level) (B) between the major river basins (C). Arrow: Alto do Palácio locality. Star: Belo Horizonte city.

The study area is largely covered by open fields (grasslands) with patches of rocky outcrops that are covered by plant species typical of the *campos rupestres* habitat. The area also includes numerous watersheds that are bordered by short riparian forests (Figure 2). Those watersheds form the headwaters of the Rio Preto, an important affluent of the Rio Doce basin.

Serra do Cipó experiences little variation in annual and monthly temperatures (Madeira and Fernandes 1999), but a high degree of daily temperature variation reaching up to 20°C in winter (Goulart and Rodrigues 2007). Typical conditions at AP are cold and windy at night and hot by midday. Mist is very common throughout the year on the eastern slopes of PNSC (Ribeiro *et al*. 2009). A climate diagram constructed from temperature and rainfall data collected *in situ* from February 2005 to December 2008 shows a great degree of variation in rainfall throughout the year. Mean annual rainfall is around 1500 mm but there is a soil water deficit from May to August, which coincides with the coldest months, while there is water in excess from November to March, the warmest months (Figure 3).

Habitats were classified in three basic types (Figure 4): (1) rocky outcrops, covered by herbaceous vegetation comprising typical *campos rupestres* plants, such as Bromeliaceae, Orchidaceae, Velloziaceae, Cactaceae, and small trees (up to 3 m tall) such as *Eremanthus erythropappus* (DC.) MacLeish and *Eremanthus crotonoides* (DC.) Sch . Bip. (Asteraceae); (2) open fields, comprising (2a) grasslands ("*campo limpo*") dominated by Cyperacea (*e.g. Lagenocarpus tenuifoliuss* (Boeck.) Kuntze and *L. rigidus* (Kunth) Nees), Poaceae (*e.g. Panicum loreum* Trin.), Eriocaulaceae *Paepalanthus* spp., and Xyridaceae *Xyris* spp.; (2b) shrublands, characterized by scattered trees and shrubs ("*campos sujos*"), such as glory bushes *Tibouchina* sp. and *Lavoisiera imbricata* DC. (Melastomataceae) and *Baccharis itatiaiae* Wawra (Asteraceae); (3) woodlands comprising (3a) riparian forest, along watercourses and consisting of dense vegetation with 2 to 3 m tall trees such as *Miconia chartacea* Triana (Melastomataceae); (3b) "*candeial*", a formation of dense groups of *Eremanthus crotonoides*, a 3 to 5 m tall tree; and (3c) forests, which includes several patches of tall semi-deciduous ("*capões*") trees and mature forest areas of different sizes, with canopies reaching up to 15-20 m tall and emergent trees of up to 25 m. The largest patch of forest surveyed is directly connected to the riparian forests and *candeial*, forming a complex matrix of habitats for which it was sometimes difficult to establish clear boundaries.

Data Collection

We conducted visual, auditory and mist-netting (12 x·2.5 m, 36 mm mesh) surveys throughout the area from January 2007 to January 2010. Mist-netting efforts included a 2-3 day visits every month over a 24-month period, *i.e.* 4,450 net-h in total.

We assigned a habitat type (rocky outcrops, open fields or woodlands) to each species based on its occurrence there. Common species were seen during more than 50% of the field trips; uncommon species during less than 50%; and rare species were recorded on three or less individual field trips. To assign their endemic status we followed Stotz *et al*. (1996) for Atlantic Forest; Silva and Bates (2002), with modifications suggested by Vasconcelos (2008), for Cerrado; and Vasconcelos (2008) for *campos rupestres* of the Espinhaço range and for eastern Brazilian mountaintops. Regional (Minas Gerais state), national and global conservation status follows Drummond *et al*. (2008), Silveira and Straube (2008) and BirdLife International (2009), respectively. The taxonomy used here adheres to the checklist of Brazilian birds compiled by the Comitê Brasileiro de Registros Ornitológicos (2009) except for *Scytalopus petrophilus*, which follows Whitney *et al.* (2010).

For record documentation, some voucher specimens were collected (under IBAMA permit nos. 12743-1, 12743-2 and 14496-2) and are currently housed in the bird collection of the 'Departamento de Zoologia - Universidade Federal de Minas Gerais' (DZUFMG). Others were photographed, or their voices recorded (using a Sony TCM-5000EV or Fostex FR-2LE with Sennheiser ME-66 microphones). Blood samples have been deposited in the 'Banco de DNA do Laboratório de Biologia e Evolução Molecular' (BD-LBEM), 'Departamento de Biologia Geral, Universidade Federal de Minas Gerais' (Santos *et al*. 2002). Permits for banding birds were provided by CEMAVE/ICMBio (n. 1161/3 and 1161/5).

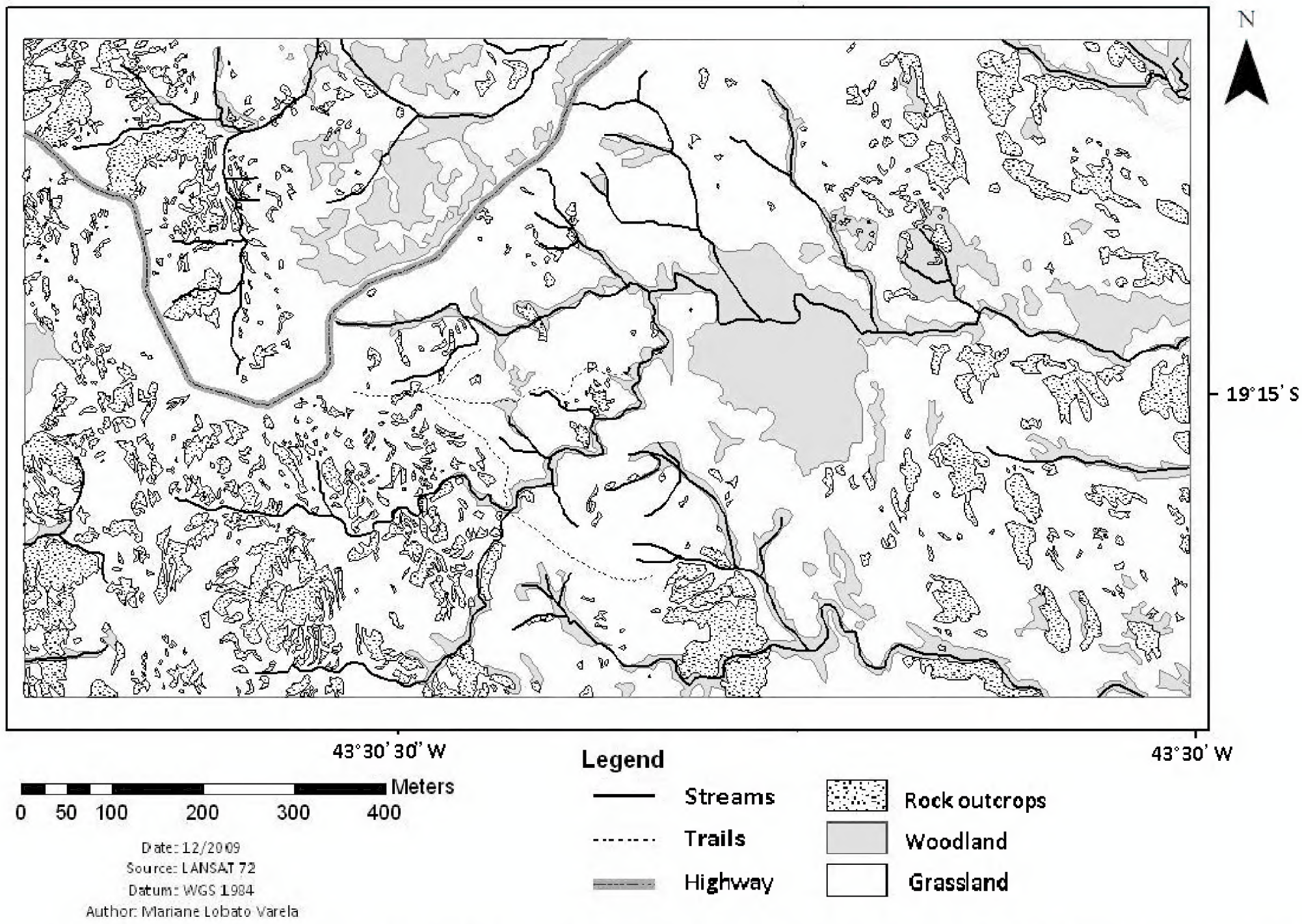

FIGURE 2. Map of Alto do Palácio site. The Serra do Cipó National Park lies at the right side of the highway shown by the headwaters that form the Rio Preto in a matrix of open fields, *campos rupestres* and woodlands. Source: Google Earth (Captured on 10 September 2009).

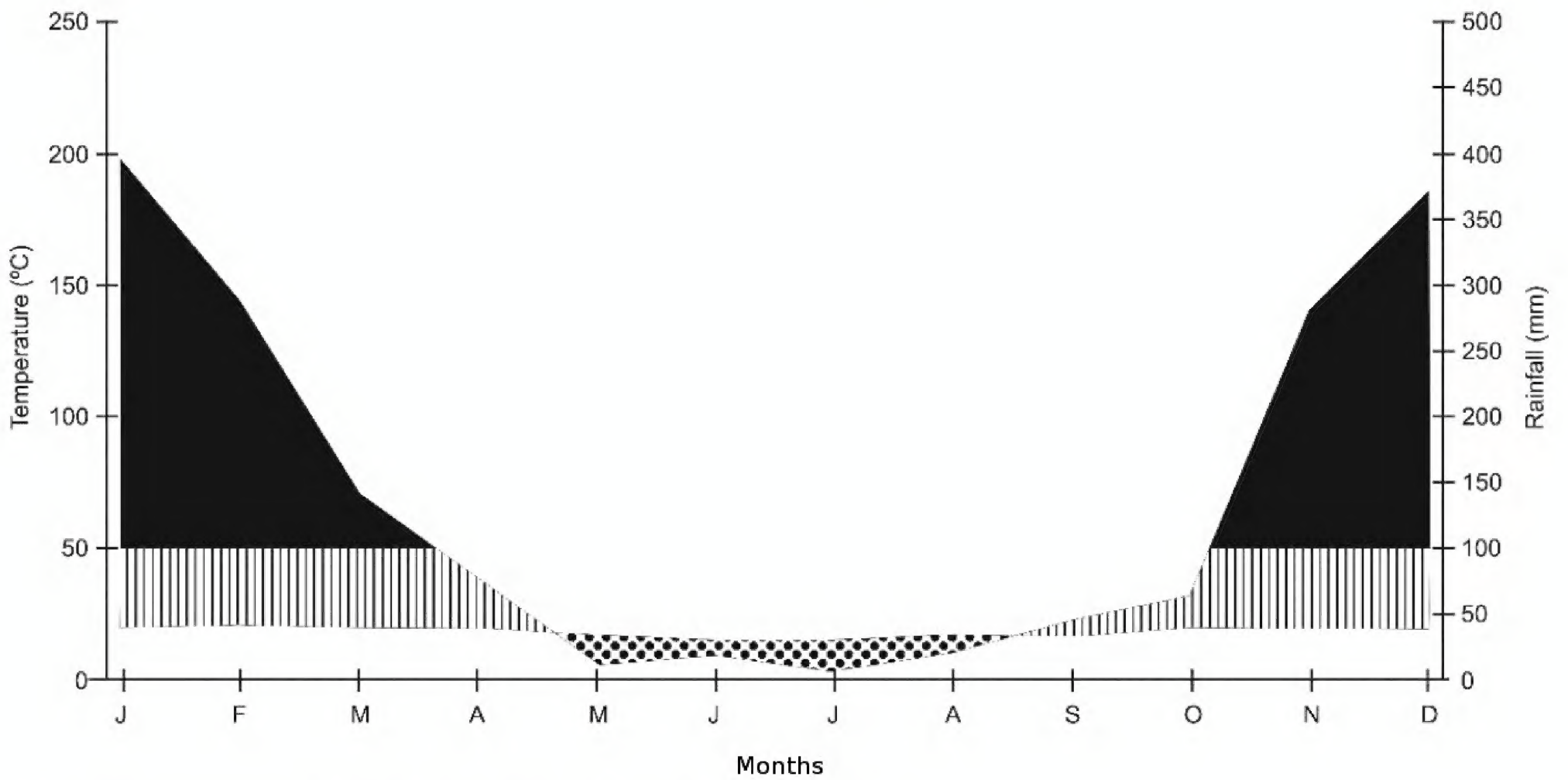

FIGURE 3. Climatic diagram of the Alto Palácio site at the Serra do Cipó National Park: soil water deficit, fluid replacement in the soil, and excess of water in the soil.

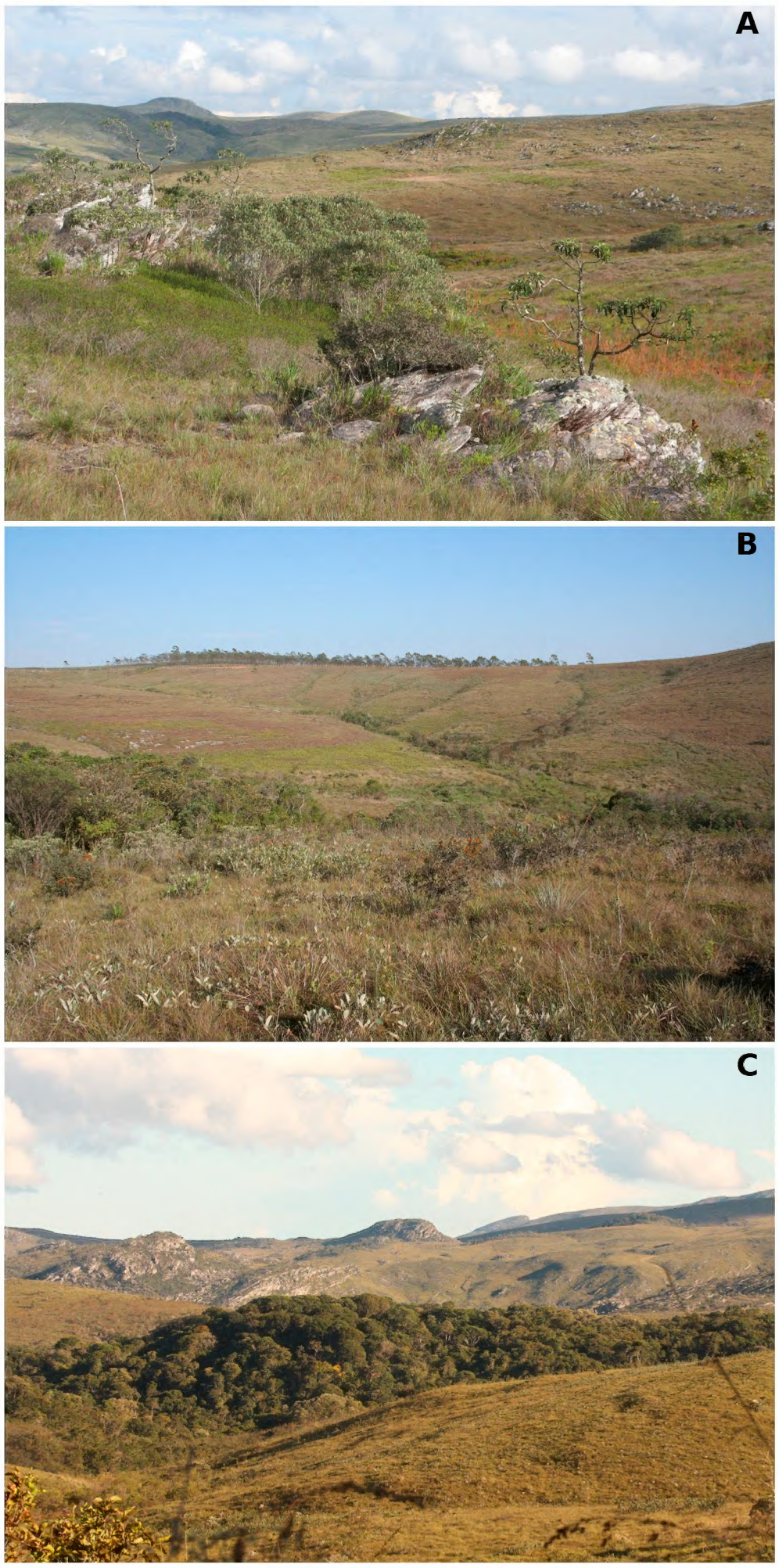

Figure 4. The main habitat types within a matrix of open fields at Alto do Palácio site at Serra do Cipó National Park: (a) patches of rocky outcrops and "candeail", (b) riparian forest in the valeys, showing some *Eucalyptus* trees bordering the study area (c) the largest patch of mature forest showing rocky outcrops in the background. Photos by G. H. S. Freitas.

Results and Discussion

A total of 151 species, belonging to 39 families, were recorded (Table 1, Figure 5). Twenty-six species (17%) recorded at AP are endemic to one or other major biome or have an even more restricted geographic distribution. Nineteen are considered endemic to the Atlantic Forest, while *Antilophia galeata* (Lichtenstein, 1823), *Cyanocorax cristatellus* (Temminck, 1823), and *Poospiza cinerea* Bonaparte, 1850 are the only three species considered endemic to the Cerrado region of central South America. Four species recorded at AP, *Polystictus superciliaris* (Wied, 1831), *Embernagra longicauda* Strickland, 1844, *Augastes scutatus* (Temminck, 1824) and *Asthenes luizae* Vielliard, 1990, are endemic to the mountaintops of southeastern Brazil, with the last two restricted to *campos rupestres* of the Espinhaço range.

Five species are considered globally Near Threatened, and four are threatened. *Culicivora caudacuta* is globally, nationally and regionally Vulnerable, *Poospiza cinerea* and *Asthenes luizae* are globally Vulnerable, and *Scytalopus iraiensis* is considered globally and nationally Endangered. Also, two species are considered to be Data Deficient regionally: *Sarcoramphus papa* (Linnaeus, 1758) and *Emberizoides ypiranganus*.

Woodland habitats were found to harbor most (90) of the species, with 55 being closely associated to it (*i.e.* all records were made exclusively in that habitat), while 39 species occurred on rocky outcrops (with three species recorded only in this habitat), and 55 species in open fields with 21 species closely associated to it (Table 1).

Open fields constitute the most extensive area of habitat found in the study area. Some species of those habitats were only recorded during the breeding season, such as *Gallinago undulata* (Boddaert, 1783), *Sicalis citrina* Pelzeln, 1870, *Tyrannus savana* Vieillot, 1808, *Volatinia jacarina* (Linnaeus, 1766), *Sporophila nigricollis* (Vieillot, 1823), and *Elaenia chiriquensis* Lawrence, 1865. Other species are present at AP year-round, although they may become more conspicuous during the breeding season, such as *Anthus hellmayri* Hartert, 1909, *Ammodramus humeralis* (Bosc, 1792), *Emberizoides herbicola* (Vieillot, 1817) and *Emberizoides ypiranganus*. The latter two, together with *Embernagra longicauda* Strickland, 1844, are closely related species that occur in geographic sympatry, but frequently in distinct micro-habitats (Costa *et al*. 2008; Rodrigues *et al*. 2009).

Grassland birds are of particular conservation concern as their habitat is being rapidly and irreversibly converted to land for cattle pasture, often by the introduction of exotic grasses. It is estimated that grassland bird populations are declining at an accelerated rate throughout the Americas due to such habitat conversion (Vickery *et al*. 1999).

The introduction of exotic grasses is a serious threat to vulnerable species like *Poospiza cinerea* and *Culicivora caudacuta* (Silveira and Straube 2008; Birdlife International 2009). The latter species is common in the open fields of AP, while the former was only recorded outside of the study area, but very close to the park boundaries, near to the road to Morro do Pilar municipality.

Hummingbirds and tyrant-flycatchers are the most diverse families on rocky outcrops. Hummingbirds are dependent on the flowering booms of the high plant species diversity found in this habitat (see Rapini *et al*. 2008). Of the three species exclusively recorded in rocky outcrops, *Muscipipra vetula* (Lichtenstein, 1823) and *Pipraeidea melanonota* (Vieillot, 1819) were considered to be restricted to forested areas (Stotz *et al*. 1996), but they have been recently recorded in other areas of *campos rupestres* (Vasconcelos and Rodrigues 2010). These species were recorded only once, when captured in mist-nets, but probably also occur in other undersampled woodland patches of AP. The other species, *Asthenes luizae*, is endemic to the Espinhaço Range (Vasconcelos 2008), was recorded in the largest patches of rocky outcrops, at the eastern border of the study area, where *Vellozia gigantea*

N.L. Menezes and Mello-Silva (Velloziaceae), an endemic plant to the Serra do Cipó occurs.

Woodlands are by far the most species-rich habitat at AP due to the fact that this habitat type presents a large spectrum of available niches (August 1983). Woodlands support many species not found in any other habitats, particularly the Atlantic forest endemics. Also, *Antilophia galeata*, a Cerrado endemic, was only recorded in woodland because this species is restricted to riparian forest (Silva and Bates 2002). It is important to note that woodland birds are more likely to escape detection than those occurring in rocky outcrops and open fields, such that the status of these woodland species should be viewed cautiously. Little is known about the bird community of high-elevation woodland patches in *campos rupestres*. Our goal here was to present a preliminary species list and assess the bird community of *campos rupestres*, but more effort concentrated exclusively in this habitat type is necessary to achieve a more complete understanding of its composition and gain some sense of its meta-population dynamics.

The Atlantic Forest is essentially a forested ecosystem that once occurred continuously along the whole east coast of Brazil (Oliveira-Filho and Fontes 2000). The southern Espinhaço range separates the Cerrado and Atlantic Forest biomes, as well as the São Francisco and Rio Doce basins. However the official limit includes the highlands of the Espinhaço range in the Cerrado domain, even those that form the Rio Doce basin, such as AP (Ribeiro *et al.* 2009). A recent study has shown the presence of typical Atlantic Forest plant taxa, similar climatic conditions, and extensive areas of deforested semi-deciduous habitat on the eastern slope of the southern Espinhaço range, to the extent of proposing new limits for the Atlantic Forest domain (Ribeiro *et al.* 2009). In fact, since 2000, the eastern slope of the Espinhaço Range in Minas Gerais state has been identified as a priority area for the conservation of mammal and bird species characteristic of the Atlantic Forest (Conservation International *et al.* 2000).

The ecotonal characteristic of AP is reflected in the presence of birds considered endemic to the Cerrado domain and others typical of open country but associated with the Cerrado (*e.g. Rhynchotus rufescens* (Temminck, 1815), *Nothura maculosa* (Temminck, 1815), *Cariama cristata* (Linnaeus, 1766)) together with birds considered endemic to the Atlantic Forest domain and other typically forest-based species (*e.g. Heliomaster squamosus* (Temminck, 1823), *Phylloscartes ventralis* (Temminck, 1824), *Poecilotriccus plumbeiceps* (Lafresnaye, 1846)). Moreover, in AP we found other species that are more related to highland areas than to one specific biome, including birds endemic to *campos rupestres* of the Espinhaço range and/or mountaintops of southeastern Brazil. These results corroborate the idea that *campos rupestres* of the southern Espinhaço Range are not an ecosystem associated with the Cerrado biome only, as it has been viewed by botanists (*e.g.* Eiten 1992; Ribeiro and Walter 1998; Rapini *et al.* 2008) and ornithologists (Silva and Bates 2002, Machado 2005). Rather, *campos rupestres* is more accurately viewed as a unique biological unit with an independent evolutionary history (Vasconcelos 2008; Ribeiro *et al.* 2009).

The AP site is one of the few protected areas on the east slope of the Espinhaço range. This area is rich in preserved natural grassland, riparian forest and relatively large patches of semi-deciduous woodland.

Campos rupestres of the Espinhaço Range act as Holocene refuges. AP harbors populations of species with disjunct distributions from those in southern Brazil (*e.g. Scytalopus iraiensis*, *Cinclodes pabsti*, and *Emberizoides ypiranganus*, and species whose closest relatives occur in the Andes and Patagonia (*e.g. Augastes scutatus* and *Asthenes luizae*). Therefore, our records for AP support the biogeographical relationship of the Espinhaço range with particular disjunct regions in South America (Sick 1985; Vielliard 1990; Silveira and Cure 1993; Stehmann and Semir 2001; Vasconcelos *et al.* 2006; Vasconcelos and Rodrigues 2010).

Our bird surveys in the highlands of PNSC reveal not only an area of high species richness, but also with a distinctive composition. AP includes species associated with the surrounding biome domains and species that are closely associated to the mountaintops of southeastern Brazil, further supporting the uniqueness of this location. By conducting such detailed surveys, we hope to establish a baseline for future studies to assess the importance and effectiveness of this national park in biological conservation efforts.

Figure 5. Selected species photographed at Alto do Palácio site, Serra do Cipó National Park: (A) *Phaethornis eurynome*, (B) *Drymophila ochropyga*, (C) *Mackenziaena leachii*, (D) *Cinclodes pabsti*, (E) *Donacospiza albifrons*, (F) *Scytalopus petrophilus*, (G) *Trogon surrucura,* (H) *Hylophilus amaurocephalus*, (I) *Muscipipra vetula*. Photos by M.L.M. Varela (A, B, C, E, F, G and H), G.H.S. Freitas (D) and D.F. Dias (I).

Table 1. Bird species recorded on 'Alto do Palácio', Serra do Cipó National Park, and its record source, habitat occurrence, abundance, endemic and conservation status. Evidence Type: S = sight, H = heard, A = audio record, P = photography, E = specimens collected, B = blood tissue collected. Habitat: R = rocky outcrops, O = open fields, W = woodlands, A = aerial. Abund. (Abundance status): C = common, U = uncommon, R = rare. End. (Endemism): Af = Atlantic forest, Ce = Cerrado, Cr = *campos rupestres* of Espinhaço Range, Mt = Eastern Mountain tops. Conserv. (Conservation status): Re, regionally threatened; Na, nationally threatened, Gl, globally threatened (DD, data deficient; NT, Near-Threatened; VU, Vulnerable; EN, Endangered). *occurs only bordering the study area in anthropomorphic areas (cattle pastures and *Eucalyptus* woodlands).

FAMILIES AND SPECIES	ENGLISH NAME	EVIDENCE TYPE	HABITAT	ABUND.	END.	CONSERV.
Tinamidae						
Crypturellus obsoletus (Temminck 1815)	Brown Tinamou	H	W	U		
Crypturellus parvirostris (Wagler 1827)	Small-billed Tinamou	H	O	C		
Rhynchotus rufescens (Temminck 1815)	Red-winged Tinamou	S, A	O, R	C		
Nothura maculosa (Temminck 1815)	Spotted Nothura	H, P	O, R	C		
Cracidae						
Penelope obscura Temminck 1815	Dusky-legged Guan	S, H	W	R		
Cathartidae						
Cathartes aura (Linnaeus 1758)	Turkey Vulture	P	A	C		
Cathartes burrovianus Cassin 1845	Lesser Yellow-headed Vulture	S	A	U		
Coragyps atratus (Bechstein 1793)	Black Vulture	S	A	U		
Sarcoramphus papa (Linnaeus 1758)	King Vulture	P	A	U		Re (DD)
Accipitridae						
Elanus leucurus (Vieillot 1818)	White-tailed Kite	S	A	R		
Heterospizias meridionalis (Latham 1790)	Savanna Hawk	P, H	A	R		
Rupornis magnirostris (Gmelin 1788)	Roadside Hawk	S, H	A	C		
Buteo albicaudatus Vieillot 1816	White-tailed Hawk	P, A	A	U		
Buteo melanoleucus (Vieillot 1819)	Black-chested Buzzard-Eagle	S	A	R		
Buteo albonotatus Kaup 1847	Zone-tailed Hawk	S, H	A	R		
Falconidae						
Caracara plancus (Miller 1777)	Southern Caracara	P, H	A	C		
Milvago chimachima (Vieillot 1816)	Yellow-headed Caracara	P, H	A	C		
Herpetotheres cachinnans (Linnaeus 1758)	Laughing Falcon	S, A	A	U		
Falco sparverius Linnaeus 1758	American Kestrel	S, H	A	U		
Falco femoralis Temminck 1822	Aplomado Falcon	P	A	U		
Rallidae						
Aramides cajanea (Statius Muller 1776)	Gray-necked Wood-Rail	H, A	W	U		
Porzana albicollis (Vieillot 1819)	Ash-throated Crake	A	W, O	U		
Cariamidae						
Cariama cristata (Linnaeus 1766)	Red-legged Seriema	S, A	O	C		
Charadriidae						
Vanellus chilensis (Molina 1782)	Southern Lapwing	P, H	O*	C		
Scolopacidae						
Gallinago paraguaiae (Vieillot 1816)	South American Snipe	A	O	U		
Gallinago undulata (Boddaert 1783)	Giant Snipe	A	O	U		
Columbidae						
Columbina squammata (Lesson 1831)	Scaled Dove	H	O	R		
Patagioenas speciosa (Gmelin 1789)	Scaled Pigeon	H	W	R		
Patagioenas picazuro (Temminck 1813)	Picazuro Pigeon	S, H	W, A	U		
Patagioenas cayennensis (Bonnaterre 1792)	Pale-vented Pigeon	S, A	W, A	U		
Patagioenas plumbea (Vieillot 1818)	Plumbeous Pigeon	H	W	R		
Zenaida auriculata (Des Murs 1847)	Eared Dove	S, H	W, R	U		
Psittacidae						
Aratinga aurea (Gmelin 1788)	Peach-fronted Parakeet	S, A	W, A	C		
Pionus maximiliani (Kuhl 1820)	Scaly-headed Parrot	S, A	W, A	U		
Cuculidae						
Piaya cayana (Linnaeus 1766)	Squirrel Cuckoo	P, H	W	U		
Guira guira (Gmelin 1788)	Guira Cuckoo	S	O*	R		
Tytonidae						
Tyto alba (Scopoli 1769)	Barn Owl	S	O	R		

Table 1. ***Continued.***

FAMILIES AND SPECIES	ENGLISH NAME	EVIDENCE TYPE	HABITAT	ABUND.	END.	CONSERV.
Strigidae						
Megascops choliba (Vieillot 1817)	Tropical Screech-Owl	A	W	U		
Glaucidium brasilianum (Gmelin 1788)	Ferruginous Pygmy-Owl	H	W	R		
Athene cunicularia (Molina 1782)	Burrowing Owl	P, H	O, R*	C		
Caprimulgidae						
Chordeiles pusillus Gould 1861	Least Nighthawk	P, H	O, R	U		
Caprimulgus longirostris Bonaparte 1825	Band-winged Nightjar	P, A	O, R	C		
Caprimulgus maculicaudus (Lawrence 1862)	Spot-tailed Nightjar	P, A	O	U		
Apodidae						
Cypseloides senex (Temminck 1826)	Great Dusky Swift	P, H	A	U		
Streptoprocne zonaris (Shaw 1796)	White-collared Swift	P, H	A	C		
Streptoprocne biscutata (Sclater 1866)	Biscutate Swift	P, H	A	R		
Trochilidae						
Phaethornis pretrei (Lesson and Delattre 1839)	Planalto Hermit	P, H	W, R	C		
Phaethornis eurynome (Lesson 1832)	Scale-throated Hermit	P	W	R	Af	
Campylopterus largipennis (Boddaert 1783)	Gray-breasted Sabrewing	P, H, E	W, R	C		
Eupetomena macroura (Gmelin 1788)	Swallow-tailed Hummingbird	P, H	W, R	C		
Colibri serrirostris (Vieillot 1816)	White-vented Violet-ear	P, A	W, R, O	C		
Chlorostilbon lucidus (Shaw 1812)	Glittering-bellied Emerald	P, H	W, R, O	C		
Thalurania furcata (Gmelin 1788)	Fork-tailed Woodnymph	P	W	U		
Thalurania glaucopis (Gmelin 1788)	Violet-capped Woodnymph	P	W	U	Af	
Leucochloris albicollis (Vieillot 1818)	White-throated Hummingbird	P	W, R	R	Af	
Amazilia versicolor (Vieillot 1818)	Versicolored Emerald	P	W, R	R		
Amazilia lactea (Lesson 1832)	Sapphire-spangled Emerald	P	W, R	U		
Augastes scutatus (Temminck 1824)	Hyacinth Visorbearer	P, A	W, R, O	C	Cr, Mt	Gl (NT)
Heliomaster squamosus (Temminck 1823)	Stripe-breasted Starthroat	P	W	R		
Trogonidae						
Trogon surrucura Vieillot 1817	Surucua Trogon	P	W	R	Af	
Alcedinidae						
Chloroceryle americana (Gmelin 1788)	Green Kingfisher	P	W	R		
Bucconidae						
Nystalus chacuru (Vieillot 1816)	White-eared Puffbird	P, H	W, O	U		
Picidae						
Picumnus cirratus Temminck 1825	White-barred Piculet	P, H	W	C		
Melanerpes candidus (Otto 1796)	White Woodpecker	P, H	W*	R		
Colaptes campestris (Vieillot 1818)	Campo Flicker	P, A	W, O, R	C		
Campephilus robustus (Lichtenstein, 1818)	Robust woodpecker	A	W	R	Af	
Thamnophilidae						
Mackenziaena leachii (Such 1825)	Large-tailed Antshrike	P, A	W	C	Af	
Thamnophilus torquatus Swainson 1825	Rufous-winged Antshrike	P, H	W	C		
Thamnophilus caerulescens Vieillot 1816	Variable Antshrike	P, B, H	W	C		
Drymophila ferruginea (Temminck 1822)	Ferruginous Antbird	A	W	R	Af	
Drymophila ochropyga (Hellmayr 1906)	Ochre-rumped Antbird	P, A	W	C	Af	Gl (NT)
Pyriglena leucoptera (Vieillot 1818)	White-shouldered Fire-eye	H	W	R	Af	
Conopophagidae						
Conopophaga lineata (Wied 1831)	Rufous Gnateater	P, H	W	U	Af	
Rhinocryptidae						
Scytalopus petrophilus Whitney et al. 2010	Mouse-colored Tapaculo	P, B, A, E	W, R	C	Af	
Scytalopus iraiensis Bornschein, Reinert and Pichorim 1998	Marsh Tapaculo	P, B, A, E	O	C	Af	Gl, Na (EN)
Furnariidae						
Cinclodes pabsti Sick 1969	Long-tailed Cinclodes	P, H	O	R	Af	Gl (NT)
Synallaxis albescens Temminck 1823	Pale-breasted Spinetail	H	O*	R		
Synallaxis spixi Sclater 1856	Spix's Spinetail	P, A	O, W	C		

Table 1. ***Continued.***

FAMILIES AND SPECIES	ENGLISH NAME	EVIDENCE TYPE	HABITAT	ABUND.	END.	CONSERV.
Asthenes luizae Vielliard 1990	Cipo Canastero	P, A	R	C	Cr, Mt	Gl (Vu)
Anumbius annumbi (Vieillot 1817)	Firewood-Gatherer	S	W*	R		
Lochmias nematura (Lichtenstein 1823)	Sharp-tailed Streamcreeper	P, H	W	C		
Xenops rutilans Temminck 1821	Streaked Xenops	P	W	R		
TYRANNIDAE						
Mionectes rufiventris Cabanis 1846	Gray-hooded Flycatcher	P, H	W	U	Af	
Poecilotriccus plumbeiceps (Lafresnaye 1846)	Ochre-faced Tody-Flycatcher	P	W	U		
Phyllomyias fasciatus (Thunberg 1822)	Planalto Tyrannulet	H	W	U		
Elaenia flavogaster (Thunberg 1822)	Yellow-bellied Elaenia	P, H	W, O	U		
Elaenia cristata Pelzeln 1868	Plain-crested Elaenia	P	W, R	R		
Elaenia chiriquensis Lawrence 1865	Lesser Elaenia	P, H, B	R, O, W	C		
Elaenia obscura (d'Orbigny and Lafresnaye 1837)	Highland Elaenia	P, A, B, E	W, R	C		
Camptostoma obsoletum (Temminck 1824)	Southern Beardless-Tyrannulet	P, H	R, O, W	C		
Serpophaga nigricans (Vieillot 1817)	Sooty Tyrannulet	P, A	W	R		
Polystictus superciliaris (Wied 1831)	Gray-backed Tachuri	P, A, B, E	R, O	C	Mt	Gl (NT)
Phylloscartes ventralis (Temminck 1824)	Mottle-cheeked Tyrannulet	P, A	W	U		
Culicivora caudacuta (Vieillot 1818)	Sharp-tailed Tyrant	P, A, B	O	C		Gl, Na, Re (VU)
Tolmomyias flaviventris (Wied 1831)	Yellow-breasted Flycatcher	P	W	U		
Myiophobus fasciatus (Statius Müller 1776)	Bran-colored Flycatcher	P, A	W, O	C		
Lathrotriccus euleri (Cabanis 1868)	Euler's Flycatcher	P, H	W	U		
Knipolegus lophotes Boie 1828	Crested Black-Tyrant	P	R, O, W	C		
Knipolegus nigerrimus (Vieillot 1818)	Velvety Black-Tyrant	P	R, O, W	C	Af	
Xolmis cinereus (Vieillot 1816)	Gray Monjita	P, H	O, R	U		
Xolmis velatus (Lichtenstein 1823)	White-rumped Monjita	P, H	O	C		
Muscipipra vetula (Lichtenstein 1823)	Shear-tailed Gray Tyrant	P	R	R	Af	
Pitangus sulphuratus (Linnaeus 1766)	Great Kiskadee	S, H	O, W	U		
Tyrannus melancholicus Vieillot 1819	Tropical Kingbird	P, H	W	U		
Tyrannus savana Vieillot 1808	Fork-tailed Flycatcher	S, H	O, A	R		
Myiarchus swainsoni Cabanis and Heine 1859	Swainson's Flycatcher	H	W	U		
Myiarchus ferox (Gmelin 1789)	Short-crested Flycatcher	P, H, B	W	C		
Myiarchus tyrannulus (Statius Muller 1776)	Brown-crested Flycatcher	P, H	W	U		
PIPRIDAE						
Antilophia galeata (Lichtenstein 1823)	Helmeted Manakin	P	W	R	Ce	
Chiroxiphia caudata (Shaw and Nodder 1793)	Blue Manakin	A	W	U	Af	
VIREONIDAE						
Cyclarhis gujanensis (Gmelin 1789)	Rufous-browed Peppershrike	P, A	W	U		
Hylophilus amaurocephalus (Nordmann 1835)	Gray-eyed Greenlet	P	W	R		
CORVIDAE						
Cyanocorax cristatellus (Temminck 1823)	Curl-crested Jay	P, A	O, W	C	Ce	
HIRUNDINIDAE						
Pygochelidon cyanoleuca (Vieillot 1817)	Blue-and-white Swallow	P, H	A	C		
Stelgidopteryx ruficollis (Vieillot 1817)	Southern Rough-winged Swallow	P, H	A	C		
Progne tapera (Vieillot 1817)	Brown-chested Martin	S, H	A	U		
Progne chalybea (Gmelin 1789)	Grey-breasted Martin	P, H	A	U		
Tachycineta leucorrhoa (Vieillot 1817)	White-rumped Swallow	P, H	A	U		
TROGLODYTIDAE						
Troglodytes musculus Naumann 1823	Southern House-Wren	P, A	W	C		
TURDIDAE						
Turdus rufiventris Vieillot 1818	Rufous-bellied Thrush	P, H	W	C		
Turdus leucomelas Vieillot 1818	Pale-breasted Thrush	P, A	W	C		
Turdus amaurochalinus Cabanis 1850	Creamy-bellied Thrush	H	W	R		
Turdus albicollis Vieillot 1818	White-necked Thrush	P	W	R		
MIMIDAE						
Mimus saturninus (Lichtenstein 1823)	Chalk-browed Mockingbird	P, H	W, R, O	C		

Table 1. ***Continued.***

FAMILIES AND SPECIES	ENGLISH NAME	EVIDENCE TYPE	HABITAT	ABUND.	END.	CONSERV.
Motacillidae						
Anthus hellmayri Hartert 1909	Hellmayr's Pipit	P, A, E	O, R	C		
Thraupidae						
Saltator similis d'Orbigny and Lafresnaye 1837	Green-winged Saltator	P, A, B	W	C		
Schistochlamys ruficapillus (Vieillot 1817)	Cinnamon Tanager	P, A	W, O, R	C		
Trichothraupis melanops (Vieillot 1818)	Black-goggled Tanager	H	W	R		
Pipraeidea melanonota (Vieillot 1819)	Fawn-breasted Tanager	P	R	R		
Tangara cyanoventris (Vieillot 1819)	Gilt-edged Tanager	P, H	W	U	Af	
Tangara cayana (Linnaeus 1766)	Burnished-buff Tanager	P, H, B, E	W	C		
Emberizidae						
Zonotrichia capensis (Statius Muller 1776)	Rufous-collared Sparrow	P, A	R, O	C		
Ammodramus humeralis (Bosc 1792)	Grassland Sparrow	P, A	O, R	U		
Haplospiza unicolor Cabanis 1851	Uniform Finch	P	W	R	Af	
Donacospiza albifrons (Vieillot 1817)	Long-tailed Reed-Finch	P, A, B, E	W, R, O	C		
Poospiza cinerea Bonaparte 1850	Cinereous Warbling-Finch	P, A	O	R	Ce	Gl (VU)
Sicalis citrina Pelzeln 1870	Stripe-tailed Yellow-Finch	P, A	O, R	U		
Emberizoides herbicola (Vieillot 1817)	Wedge-tailed Grass-Finch	P, A, B	O	C		
Emberizoides ypiranganus Ihering and Ihering 1907	Lesser Grass-Finch	P, A, B, E	O	C		Re (DD)
Embernagra longicauda Strickland 1844	Pale-throated Serra-Finch	P, A, B	R, W, O	C	Mt	Gl (NT)
Volatinia jacarina (Linnaeus 1766)	Blue-black Grassquit	P, H	O	U		
Sporophila nigricollis (Vieillot 1823)	Yellow-bellied Seedeater	P, A	O	U		
Sporophila caerulescens (Vieillot 1823)	Double-collared Seedeater	S	O	R		
Parulidae						
Geothlypis aequinoctialis (Gmelin 1789)	Masked Yellowthroat	P, A,	W, O	C		
Basileuterus culicivorus (Deppe 1830)	Golden-crowned Warbler	P, A,	W	C		
Basileuterus hypoleucus Bonaparte 1830	White-bellied Warbler	P, A	W	R		
Icteridae						
Pseudoleistes guirahuro (Vieillot 1819)	Yellow-rumped Marshbird	P, A	O, R	C		
Molothrus bonariensis (Gmelin 1789)	Shiny Cowbird	P, H	R, O	U		
Fringillidae						
Sporagra magellanica (Vieillot 1805)	Hooded Siskin	S	O	R		
Euphonia chlorotica (Linnaeus 1766)	Purple-throated Euphonia	S, H	W	C		
Euphonia cyanocephala (Vieillot 1818)	Golden-rumped Euphonia	P, H	R, W	R		

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